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EXAMINER	
CHUO, TONY SHENG HSIANG	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/795,952	KOMURA ET AL.	
	Examiner	Art Unit	
	Tony Chuo	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) *10 and 11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Claims 1-9 and 12-13 are currently pending. The 112, 1st paragraph rejection of claims 7-9 is withdrawn. The certified English translations of the foreign priority documents do overcome the 102 and 103 rejections of claims 1-6, 8, 12, and 13. However, upon further consideration, claims 1-6, 8, 12, and 13 are rejected under the following new 103 rejections. Claims 7 and 9 stand rejected under the previously stated 103 rejections.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Herceg (US 4666798), and further in view of Narayanan et al (US 6680139).

The Badding reference discloses fuel cell "200" comprising: an array of fuel cells wherein each electrochemical cell includes an anode "16", a cathode "12", and an electrolyte sheet "10" in between the anode and cathode; an interconnect "14" that is an electrical conductor that is disposed between a pair of adjacent fuel cells and is not

stacked on either of the adjacent fuel cells wherein the interconnect is electrically connected to the cathode of one of the adjacent fuel cell and extending in parallel to the cathode and is also electrically connected to the anode of the other of the adjacent fuel cell and extending in parallel to the anode (See paragraph [0030] and Figure 1B). It also discloses an interconnect "14" that is arranged in a substantially same plane with the anode "16" and the cathode "12" (See Figure 1B). Examiner's note: Since the interconnect is in the same plane as the anode and cathode, it would also be in the same plane as the gas diffusion layers that are part of the anode and cathode.

However, Badding et al does not expressly teach a first electrically conductive film and a second electrically conductive film, wherein the first electrically conductive film or the second electrically conductive film has an expansion between the adjacent power generation units for connecting the first electrically conducting film and the second electrically conducting film, and wherein the a portion of each electrolyte of the pair of adjacent power generation units is sandwiched between the first and second electrically conductive films. The Herceg reference discloses an array of fuel cell segments "26" that are connected in series, wherein the adjacent fuel cell segments are electrically connected by a first electrically conductive layer "38", a second electrically conductive layer "39", and an interconnect "41", wherein the first electrically conductive layer and the second electrically conductive layer has an expansion "41" between the adjacent fuel cell segments for connecting the first electrically conductive layer and the second electrically conductive layer (See column 8, lines 27-48 and Figure 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding interconnect to include a first electrically conductive film and a second electrically conductive film, wherein the first electrically conductive film or the second electrically conductive film has an expansion between the adjacent power generation units for connecting the first electrically conducting film and the second electrically conducting film, and wherein the a portion of each electrolyte of the pair of adjacent power generation units is sandwiched between the first and second electrically conductive films in order to form a more durable electrical connection between adjacent fuel cells.

However, Badding et al as modified by Herceg does not expressly teach a porous insulating film wherein a plurality of power generating unit is positioned on top of the porous insulating film. The Narayanan reference discloses a porous insulating film "120" wherein a plurality of fuel cell elements "97","98","99" are positioned on top of the porous insulating film (See Figure 1B).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Herceg fuel cell to include a porous insulating film wherein a plurality of power generating unit is positioned on top of the porous insulating film in order to provide a substrate for supporting the fuel cells.

4. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Herceg (US 4666798) and Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Winsel et al (US 3770509).

However, the Badding et al as modified by Herceg and Narayanan et al does not expressly teach a first or second electrically conductive film that is made of a resin and an electrically conductive material. The Winsel reference discloses electrically connecting two gas diffusion layers with an electrically conductive resin comprising a plastic base material and a metal or graphite power (See column 3, line 63 to column 4, line 4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Herceg/Narayanan fuel cell to include either a first or second electrically conductive film that is made of an electrically conductive resin in order to utilize a material that has high adhesive strength, electrical conductivity, and plastic flow.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Herceg (US 4666798) and Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Maeda et al (JP 2003-197225).

However, the Badding et al as modified by Herceg and Narayanan et al does not expressly teach a film having windows that is laminated on the porous insulating film such that at least one of the first and second electrodes of the power generating units are disposed in the windows. The Maeda reference discloses an insulating film "120" that has windows wherein the unit cells are disposed in the windows (See Drawing 4(a)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Herceg/Narayanan fuel cell to include a film having windows that is laminated on the porous insulating film such that at least one of the first and second electrodes of the power generating units are disposed in the windows in order to provide an additional layer for supporting the electrochemical cells.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Herceg (US 4666798) and Narayanan et al (US 6680139) as applied to claim 1 above, and further in view of Nishiumi et al (US 2002/0187382).

However, Badding et al as modified by Herceg and Narayanan et al does not expressly teach a reactant gas supply passage and a reactant gas discharge passage that extends through an end of the fuel cell. The Nishiumi reference discloses a reactant gas supply passage "228" and a reactant gas discharge passage "229" that extend through an end of the fuel cell (See Figures 4 and paragraph [0048]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Herceg/Narayanan fuel cell to include a reactant gas supply passage and a reactant gas discharge passage that extend through an end of the fuel cell in order to able to supply and discharge the electrochemical cells with reactant gases.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262). The

Narayanan reference discloses a plurality of membrane electrode assemblies "97","98","99", each comprising: an anode "104" and a cathode "103" wherein each anode and cathode includes a gas diffusion backing layer and a catalyst layer stacked together; wherein the first end of the first gas diffusion layer of cathode "103" of MEA "97" protrudes toward MEA "98" and the second end of the second gas diffusion layer of anode "104" of MEA "98" protrudes toward MEA "97"; and wherein the first end and the second end are electrically connected with each other by an interconnect "135" extending through at least the electrolyte (See column 2, lines 12-15, column 2 lines 65 to column 3 line 5, and Figure 1B).

However, Narayanan et al does not expressly teach a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer. The Kuroki reference discloses the first end of the first gas diffusion layers "15" that extends beyond the first end of the first catalyst layer "13"; a second end of the second gas diffusion layer "16" that extend beyond the second end of the second catalyst layer "14"; a first

reinforcing seal gasket "20" that is in physical contact with and interposed between the electrolyte "12" and first end of the first electrically conductive gas diffusion layer "15" of the first electrode wherein the reinforcing seal gasket is separate from the first catalyst layer "13"; and a second reinforcing seal gasket "21b" that is in physical contact with and interposed between the electrolyte "12" and the second end of the second electrically conductive gas diffusion layer "16" of the second electrode wherein the second reinforcing seal gasket is separate from the second catalyst layer "14" (See Figure 8 and paragraph [0144],[0145]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan fuel cell to include a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer in order to improve the seal between the first and second gas diffusion layers.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262) as applied to

claim 7 above, and further in view of Batfalsky et al (US 2003/0113609). In addition, the Narayanan reference also discloses first electrically conductive gas diffusion layer of the first electrode of the first power generation unit "97" and the second electrically conductive gas diffusion layer of the second electrode of the second power generation unit "98" that have overlapping portions with the electrolyte interposed between the overlapping portions and are electrically connected together by the interconnect "135" (See Figure 1B).

However, Narayanan et al as modified by Kuroki et al does not expressly teach an electrically conductive member that is an electrically conductive rivet member. The Batfalsky reference discloses contact elements "3" that are electrically conductive rivet members (See paragraph [0021] and Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Kuroki fuel cell to include an electrically conductive member that is an electrically conductive rivet member in order to utilize contact elements that are suitable for current conducting and are easily deformable.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Kuroki et al (US 2003/0104262) as applied to claim 7 above, and further in view of Jansing et al (US 5942348). In addition, the Narayanan reference also discloses an electrolyte "115" that is an electrolyte membrane; and power generation units "97","98","99" that are arranged in the same plane to form an MEA unit (See column 2, lines 6-7 and Figure 1B).

However, Narayanan et al as modified by Kuroki et al does not expressly teach a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator. The Jansing reference discloses a first electrically insulating bipolar plate "30" and a second electrically insulating bipolar plate "30'" that sandwich the MEA "43"; oxygen gas grooves "31" facing the MEA "43" that is provided on the first electrically insulating bipolar plate; and hydrogen gas grooves "31'" facing the MEA "43" that is provided on the second electrically insulating bipolar plate (See column 8, lines 8-16 and Figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Kuroki fuel cell to include a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator in order to prevent an electrical short circuit between the power generation units and to be able to supply reaction gases to the membrane electrode assemblies.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Jansing et al (US 5942348), Nishiumi et al (US 2002/0187382), and Richards (US 5547777). The Badding reference discloses a plurality of fuel cells wherein each fuel cell includes a plurality of power generation units

arranged in the same plane and wherein each power generation unit includes a first electrode, a second electrode, and an electrolyte interposed between the first and second electrode (See Figure 1B).

However, Badding et al does not expressly teach a pair of electrically insulating separators for sandwiching the power generation units. The Jansing reference discloses a first electrically insulating bipolar plate "30" and a second electrically insulating bipolar plate "30'" that sandwich the MEA "43" (See column 8, lines 8-16 and Figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding fuel cell to include a first and second electrically insulating separators for sandwiching the MEA unit in order to prevent an electrical short circuit between the power generation units.

However, Badding et al as modified by Jansing et al does not expressly teach a plurality of guide grooves that are formed on at least one of the separators on the surface opposite to a surface facing the power generation units for supplying a coolant along the separator; a reactant gas supply passage and a reactant gas discharge passage that extend through the fuel cells in a stacking direction of the fuel cells; and a seal member provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the reactant gas supply passage and the reactant gas discharge passage from the coolant passage. The Nishiumi reference discloses a cooling water passages "226" that are formed on at least one of the separator "218" on a surface opposite to a surface facing

the membrane electrode assembly for supplying a coolant along the separator; a reactant gas supply passage "231" and a reactant gas discharge passage "231" that extend through the fuel cells in a stacking direction of the fuel cells; and a gasket provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the reactant gas supply passage and the reactant gas discharge passage from the coolant passage (See paragraph [0048],[0060] and Figures 4 and 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing fuel cell to include a plurality of guide grooves that are formed on at least one of the separators on the surface opposite to a surface facing the power generation units for supplying a coolant along the separator; a reactant gas supply passage and a reactant gas discharge passage that extend through the fuel cells in a stacking direction of the fuel cells; and a seal member provided on the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the seal member separates the reactant gas supply passage and the reactant gas discharge passage from the coolant passage in order to regulate the temperature of the fuel cell and to simplify the structure by providing internal common manifolds for supplying and discharging the reactant gases.

However, Badding et al as modified by Jansing et al and Nishiumi et al does not expressly teach a casing containing the fuel cells; and a coolant passage formed in a spacing between the casing and the plurality of fuel cells so that the coolant flows along

a surface of the casing wherein the coolant passage is connected to the guide grooves of each of the fuel cells in the casing. The Richards reference discloses a cooling jacket "27" formed in a space between the housing "20" and the fuel cells "10" so that the coolant flows along a surface of the housing (See column 17, lines 26-30, column 18, lines 34-36, and Figure 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing/Nishiumi fuel cell to include a casing containing the fuel cells; and a coolant passage formed in a spacing between the casing and the plurality of fuel cells so that the coolant flows along a surface of the casing wherein the coolant passage is connected to the guide grooves of each of the fuel cells in the casing in order to simplify the structure by using the space between the housing and the fuel cells as an internal manifold for distributing the coolant.

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Badding et al (US 2001/0044041) in view of Jansing et al (US 5942348), Nishiumi et al (US 2002/0187382), and Richards (US 5547777) as applied to claim 12 above, and further in view of Ide et al (JP 63-279578).

However, Badding et al as modified by Jansing et al, Nishiumi et al, and Richards does not expressly teach a seal member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the sealing member includes a bent portion that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing and the side surface of the at least one of the

separators. The Ide reference discloses a gas separator "1" that includes a seal member "4" member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units and a bent portion "6" that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing "5" and the side surface of the at least one of the separators "1" (See Abstract and Drawings 6 and 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Badding/Jansing/Nishiumi/Richards fuel cell to include a seal member that extends along an entire width of the at least one of the separators on the surface opposite to the surface facing the power generation units wherein the sealing member includes a bent portion that extends along a side surface of the at least one of the separators wherein the bent portion is interposed between the casing and the side surface of the at least one of the separators in order to improve the seal between the casing and the fuel cells.

Response to Arguments

12. Applicant's arguments regarding claims 7 and 9 filed 7/13/07 have been fully considered but they are not persuasive.

The applicant argues that there is no motivation to combine or modify the Narayanan reference with the Kuroki reference because one teaches spreading the cells in a horizontal plane and the other teaches the stacking of cells. Although the references teach different types of fuel cells, the concept of using a reinforcing film to

improve the seal between the gas diffusion layer and the electrolyte layer can easily be applied to Narayanan fuel cells.

The applicant also argues that Kuroki reference does not teach or suggest an electrically conductive member extending through at least the electrolyte and the first and second reinforcing films as recited in amended claim 7. The Narayanan reference teaches an electrically conductive member that extends through the electrolyte layer. Therefore, the Narayanan fuel cells were modified to include first and second reinforcing films, the electrically conductive member would also extend through the first and second reinforcing films.

The applicant also argues that the Jansing reference, like the Narayanan and Kuroki references, does not teach or suggest first and second reinforcing film, and hence does not teach or suggest an electrically conductive member extending through at least the electrolyte and the first and second reinforcing films. As stated above, Narayanan et al as modified by Kuroki et al does teach an electrically conductive member extending through at least the electrolyte and the first and second reinforcing films. Therefore, the Jansing reference is not require to teach that limitation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

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PRIMARY EXAMINER